

United States Patent

LaForge and Korver

ALGORITHMIC METHOD AND COMPUTER SYSTEM FOR SYNTHESIZING SELF-HEALING NETWORKS, BUS STRUCTURES, AND CONNECTIVITIES

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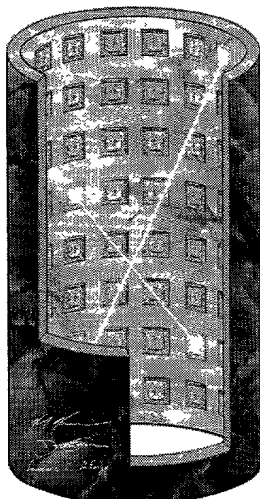
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Field of Search 703/13;
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Examiner — APPLICATION
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ABSTRACT

The invention is an algorithmic method, or a computer implementation thereof, which synthesizes connectivities. In its prototypical form, the invention computes pairwise channels for an arbitrary number of nodes, minimizing both latency and the cost of channels, such that all, or nearly all, healthy nodes remain connected, despite a prescribed number or proportion of failures in channels and/or nodes. The invention also solves a similar problem, where minimum latency is replaced or augmented by maximum throughput. In general, channels may bear a non-uniform cost, nodes are assigned a value, each channel or node has a corresponding latency and capacity, and fault patterns may be probabilistic or deterministic. In particular, the invention optimizes the connectivity of large numbers of computers, perhaps dynamically self-organizing. Beneficial applications include the design and operation of self-healing, fault tolerant multicomputers and wired networks, as well as wireless networks having little or no dependence on central antennae.

